CLAIMS

1. A method for the deposition and alignment of carbon nanotubes, comprising the steps of:

providing an assembly that comprises a substrate having at least two electrodes supported thereon and opposing one another with a gap region being defined therebetween;

depositing a carbon nanotube (CNT) attraction material on said substrate in said gap region;

applying an electric potential to said two opposing electrodes wherein an electric field is generated across said gap region;

wetting said CNT attraction material with a solution defined by a carrier liquid having carbon nanotubes (CNTs) suspended therein, wherein a first portion of said CNTs are aligned with said electric field and adhered to said CNT attraction material, and wherein a second portion of said CNTs are not adhered to said CNT attraction material; and

removing said carrier liquid and said second portion of said CNTs from said assembly.

2. A method according to claim 1 wherein said step of removing comprises the step of blowing a gas over said assembly until said carrier liquid is no longer present thereon to thereby form a final assembly.

3. A method according to claim 2 wherein said step of removing further comprises the steps of:

wetting said final assembly with a rinse liquid that can support suspension therein of any of said second portion of said CNTs remaining after said step of blowing;

vibrating said wetted final assembly; and

blowing a gas over said final assembly after being wetted and vibrated to remove said rinse liquid and any of said second portion of said CNTs suspended therein.

4. A method according to claim 3 wherein said rinse liquid is n-methylpyrolidone.

5. A method according to claim 3 wherein said gas used in each said step of blowing is nitrogen gas.

6. A method according to claim 3 wherein said step of vibrating comprises the step of transmitting acoustic wave energy towards said wetted final assembly.

7. A method according to claim 1 wherein said electric potential is one of AC potential and DC potential.

8. A method according to claim 1 wherein said CNT attraction material is a self-assembled monolayer.

9. A method according to claim 1 wherein said CNT attraction material forms at least one hydrogen bond with a sidewall of each CNT from said first portion of said CNTs.

10. A method according to claim 1 wherein said CNTs are single-wall CNTs.

11. A method according to claim 1 wherein said carrier liquid minimizes van der Waal forces between said CNTs suspended therein.

12. A method for the deposition and alignment of carbon nanotubes, comprising the steps of:

providing an assembly that comprises a substrate having at least two electrodes supported thereon and opposing one another with a gap region being defined therebetween;

depositing a CNT attraction material on at least portions of each of said two opposing electrodes and on said substrate in said gap region between said portions of each of said two opposing electrodes;

applying an electric potential to said two opposing electrodes wherein an electric field is generated across said gap region;

wetting said CNT attraction material with a solution defined by a carrier liquid having CNTs suspended therein, wherein a first portion of said CNTs are aligned with said electric field and adhered to said CNT attraction material, and wherein a second portion of said CNTs are not adhered to said CNT attraction material; and

removing said carrier liquid and said second portion of said CNTs from said assembly.

13. A method according to claim 12 wherein said step of removing comprises the step of blowing a gas over said assembly until said carrier liquid is no longer present thereon to thereby form a final assembly.

14. A method according to claim 13 wherein said step of removing further comprises the steps of:

wetting said final assembly with a rinse liquid that can support suspension therein of any of said second portion of said CNTs remaining after said step of blowing;

vibrating said wetted final assembly; and

blowing a gas over said final assembly after being wetted and vibrated to remove said rinse liquid and any of said second portion of said CNTs suspended therein.

15. A method according to claim 14 wherein said rinse liquid is n-methylpyrolidone.

16. A method according to claim 14 wherein said gas used in each said step of blowing is nitrogen gas.

17. A method according to claim 14 wherein said step of vibrating comprises the step of transmitting acoustic wave energy towards said wetted final assembly.

18. A method according to claim 12 wherein said electric potential is one of AC potential and DC potential.

19. A method according to claim 12 wherein said CNT attraction material is a self-assembled monolayer.

20. A method according to claim 12 wherein said CNT attraction material forms at least one hydrogen bond with a sidewall of each CNT from said first portion of said CNTs.

21. A method according to claim 12 wherein said CNTs are single-wall CNTs.

22. A method according to claim 12 wherein said carrier liquid minimizes van der Waal forces between said CNTs suspended therein.

23. A method for the deposition and alignment of carbon nanotubes, comprising the steps of:

providing an assembly that comprises a substrate having at least two electrodes supported thereon and opposing one another with a gap region being defined therebetween;

depositing a monolayer material on said substrate in said gap region, said monolayer material being capable of forming at least one hydrogen bond with a sidewall of a carbon nanotube when coming into contact therewith;

applying an electric potential to said two opposing electrodes wherein an electric field is generated across said gap region;

wetting said monolayer material with a solution defined by a carrier liquid having CNTs suspended therein, wherein a first portion of said CNTs are aligned with said electric field and come into contact with said monolayer material and are bonded thereto, and wherein a second portion of said CNTs do not come into contact with said monolayer material and are not bonded thereto; and

removing said carrier liquid and said second portion of said CNTs from said assembly.

24. A method according to claim 23 wherein said step of removing comprises the step of blowing a gas over said assembly until said carrier liquid is no longer present thereon to thereby form a final assembly.

25. A method according to claim 24 wherein said step of removing further comprises the steps of:

wetting said final assembly with a rinse liquid that can support suspension therein of any of said second portion of said CNTs remaining after said step of blowing;

vibrating said wetted final assembly; and

blowing a gas over said final assembly after being wetted and vibrated to remove said rinse liquid and any of said second portion of said CNTs suspended therein.

26. A method according to claim 25 wherein said rinse liquid is n-methylpyrolidone.

27. A method according to claim 25 wherein said gas used in each said step of blowing is nitrogen gas.

28. A method according to claim 25 wherein said step of vibrating comprises the step of transmitting acoustic wave energy towards said wetted final assembly.

29. A method according to claim 23 wherein said electric potential is one of AC potential and DC potential.

30. A method according to claim 23 wherein said CNTs are single-wall CNTs.

31. A method according to claim 23 wherein said carrier liquid minimizes van der Waal forces between said CNTs suspended therein.